UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Malaysia-Japan International Institute of Technology (MJIIT)

Bachelor of Software Engineering

Session 2024/2025 Semester 1

SECR 1213 Network Communication

Section - 16

Lecturer: Dr. Kaiyisah Hanis Mohd Azmi

Task- 2

Submitted by:

Group G

Liu Wanpeng(A23MJ4016)

Zhao Wei (A23MJ4018)

Thamer Alharbi (A23MJ4015)

Date of Submission: October 29, 2024

Catalogue

1. Meeting One

MEETING MINUTES

DATE/TIME	*October 10, 2024 10:00 AM*	
LOCATION	*Zoom Virtual Meeting*	
AGENDA	*Role Assignment and Initial Design Discussion*	
Meeting MC	*Liu Wanpeng*	
ATTENDANCE		
NAME	**TIME**	**REASON FOR ABSENCE**
Liu Wanpeng	*10:00*	
Zhao Wei	*10:10*	
Thamer Alharbi	*10:06*	

MINUTES			
NO.	**ITEM DISCUSSED**	**IDEAS/SUGGESTIONS AND PERSON GIVING IT**	**PERSON IN CHARGE & DATE**
1	*Role Assignment*	*Liu, Zhao, and Thamer discussed roles based on skills.*	*Liu (10/10)*
2	*Initial Design Concepts*	*Each member presented initial layout ideas.*	*Zhao (12/10)*
3	*Next Steps*	*Prepare preliminary sketch by the next meeting.*	*Liu(12/10)*
4	*Meeting ended*	*11:00*	

Meeting on Scoring Sheet

Liu Wanpeng

No.	Scoring Criteria	Score (1-5)

1	Host's Performance	5
2	Clarity of Agenda	5
3	Team Participation	4.5
4	Decision-Making Efficiency	4.5
5	Task Allocation	5
6	Overall score	5

Zhao Wei

No.	Scoring Criteria	Score (1-5)
1	Host's Performance	4
2	Clarity of Agenda	4.5
3	Team Participation	4.5
4	Decision-Making Efficiency	4
5	Task Allocation	3
6	Overall score	5

Thamer Alharbi

No.	Scoring Criteria	Score (1-5)
1	Host's Performance	3.5
2	Clarity of Agenda	4
3	Team Participation	4
4	Decision-Making Efficiency	5
5	Task Allocation	3.5
6	Overall score	4.5

2. Meeting Two

MEETING MINUTES

DATE/TIME	*October 12, 2024 10:00 AM*		
LOCATION	*Zoom Virtual Meeting*		
AGENDA	*Floor Plan Review and Feedback*		
Meeting MC	*Liu Wanpeng*		
ATTENDANCE			
NAME	**TIME**	**REASON FOR ABSENCE**	
Liu Wanpeng	*10:00*		
Zhao Wei	*10:07*		
Thamer Alharbi	*10:09*		
MINUTES			
NO.	**ITEM DISCUSSED**	**IDEAS/SUGGESTIONS AND PERSON GIVING IT**	**PERSON IN CHARGE & DATE**
1	*Floor Plan Presentation*	*Each member presented their design sketches.*	*Liu (12/10)*
2	*Software to use*	*Liu – usw CAD to draw the Graphic design drawing*	*Liu (16/10)*
3	*Feedback Discussion*	*Members provided feedback and discussed improvements.*	*Zhao (14/10)*
4	*Design Revisions*	*Revise designs based on feedback for the next meeting.*	*Thamer (14/10)*
5	*Meeting ended*	*11:00*	

Meeting Two Scoring Sheet

Liu Wanpeng

No.	Scoring Criteria	Score (1-5)
1	Host's Performance	5
2	Clarity of Agenda	5
3	Team Participation	5
4	Decision-Making Efficiency	5

5	Task Allocation	4.5
6	Overall score	5

Zhao Wei

No.	Scoring Criteria	Score (1-5)
1	Host's Performance	4
2	Clarity of Agenda	4
3	Team Participation	4
4	Decision-Making Efficiency	3.5
5	Task Allocation	3
6	Overall score	4

Thamer Alharbi

No.	Scoring Criteria	Score (1-5)
1	Host's Performance	4.5
2	Clarity of Agenda	4
3	Team Participation	4
4	Decision-Making Efficiency	3.5
5	Task Allocation	4
6	Overall score	4.5

3. Meeting Three

MEETING MINUTES

DATE/TIME	*October 14, 2024 10:00 AM*	
LOCATION	*Zoom Virtual Meeting*	
AGENDA	*Final Review and Report Preparation*	
Meeting MC	*Liu Wanpeng*	
ATTENDANCE		
NAME	**TIME**	**REASON FOR ABSENCE**
Liu Wanpeng	*10:00*	
Zhao Wei	*10:11*	
Thamer Alharbi	*10:13*	

MINUTES			
NO.	**ITEM DISCUSSED**	**IDEAS/SUGGESTIONS AND PERSON GIVING IT**	**PERSON IN CHARGE & DATE**
1	*Final Design Review*	*Final design adjustments were reviewed.*	*Liu (16/10)*
2	*Report Writing Discussion*	*Members discussed report content and structure.*	*Zhao (16/10)*
3	*Submission Preparation*	Prepare final report for submission.	*Thamer (16/10)*
4	*Meeting ended*	*11:00*	

Meeting Three Scoring Sheet

Liu Wanpeng

No.	Scoring Criteria	Score (1-5)

1	Host's Performance	5
2	Clarity of Agenda	4.5
3	Team Participation	5
4	Decision-Making Efficiency	5
5	Task Allocation	4.5
6	Overall score	5

Zhao Wei

No.	Scoring Criteria	Score (1-5)
1	Host's Performance	4
2	Clarity of Agenda	3
3	Team Participation	4
4	Decision-Making Efficiency	4.5
5	Task Allocation	3
6	Overall score	4.5

Thamer Alharbi

No.	Scoring Criteria	Score (1-5)
1	Host's Performance	4.5
2	Clarity of Agenda	5
3	Team Participation	4
4	Decision-Making Efficiency	4.5
5	Task Allocation	4
6	Overall score	5

4. Meeting Four

MEETING MINUTES

DATE/TIME	*October 29, 2024 7:00 PM*	
LOCATION	*Zoom Virtual Meeting*	
AGENDA	*Network Requirements Review and Further Analysis*	
Meeting MC	*Liu Wanpeng*	
ATTENDANCE		
NAME	**TIME**	**REASON FOR ABSENCE**
Liu Wanpeng	*10:00*	
Zhao Wei	*10:07*	
Thamer Alharbi	*10:07*	

MINUTES			
NO.	**ITEM DISCUSSED**	**IDEAS/SUGGESTIONS AND PERSON GIVING IT**	**PERSON IN CHARGE & DATE**
1	*Final Design Review*	*Discussed implementing AI-based monitoring tools.*	*Liu (29/10)*
2	*Budget Analysis*	*Proposed a phased budgeting approach.*	*Zhao (31/10)*
3	Network Topology	Explored using mesh topology for high-demand areas.	Thamer (31/10)
4	*Meeting ended*	*8:30 PM*	

Meeting Four Scoring Sheet

Liu Wanpeng

No.	Scoring Criteria	Score (1-5)

1	Host's Performance	5
2	Clarity of Agenda	4.5
3	Team Participation	5
4	Decision-Making Efficiency	5
5	Task Allocation	5
6	Overall score	5

Zhao Wei

No.	Scoring Criteria	Score (1-5)
1	Host's Performance	4
2	Clarity of Agenda	5
3	Team Participation	4
4	Decision-Making Efficiency	4.5
5	Task Allocation	3.5
6	Overall score	4.5

Thamer Alharbi

No.	Scoring Criteria	Score (1-5)
1	Host's Performance	4.5
2	Clarity of Agenda	5
3	Team Participation	4
4	Decision-Making Efficiency	4.5
5	Task Allocation	3.5
6	Overall score	4.5

5. Some questions and discussions about the project.

5.1. Does the faculty conduct regular network security checks to ensure the network is protected from external threats? 【1】

- To ensure network security, the construction team should establish a comprehensive network security strategy, including regular vulnerability scans, real-time intrusion detection systems (IDS), and automated security updates. Security checks should be conducted quarterly, with emergency checks initiated upon detecting significant vulnerabilities. This approach helps promptly identify and fix potential security risks, ensuring long-term security and stability of the network.

5.2. Does the faculty currently have a budget for Internet services, and does it need to consider additional budgets to meet new demands? 【2】

- The budget primarily focuses on capital expenditure (CapEx) for the new building, not operational expenditure (OpEx). Additionally, the construction team should propose budgets covering initial hardware procurement, network equipment installation, infrastructure construction, and future expansion needs. This includes costs for broadband internet connections, redundancy line setups, core network equipment purchases (e.g., switches and routers), and necessary network security equipment.

5.3. How does the faculty manage its network at present? Is there a dedicated IT team responsible for monitoring and maintenance? 【3】

- According to Dr‘s professional advice , UTM will handle network operations and maintenance for the new building, with a dedicated team responsible for daily network monitoring and troubleshooting. To ensure efficient network management, it is recommended to implement network management software (e.g., SolarWinds, Nagios), which helps the IT team monitor network performance, traffic flow, and device health in real-time, while generating analytical reports and alerts automatically. This approach can enhance network management efficiency and reduce the risk of unexpected outages.

5.4. Does the faculty have a data backup process? How is the security of important data ensured? 【4】

- Based on group discussions and online research, The construction team should design and implement a multi-tier data backup strategy, including daily local backups and weekly cloud backups. Important data should also be stored in an encrypted format to prevent unauthorized access. Establishing an automated backup process combined with strict access control policies ensures the integrity and availability of critical data.

5.5. What are the specific network requirements for each floor's designated purpose and each lab's function (e.g., bandwidth, data traffic, reliability)? 【5】

- Based on group discussions and online research, video conferencing rooms require high bandwidth and low latency connections, while general labs may need stable medium bandwidth. IoT labs may require high data traffic capacity and reliability to support multiple devices simultaneously. The construction team can refer to IEEE standards to define the minimum bandwidth requirements to ensure the needs of all applications are met.

5.6. What type of network topology is preferred or most suitable (e.g., star, bus, hybrid)? 【6】

- Based on group discussions and online research, to meet the multi-layer network demands of the new building, a hybrid network topology is recommended. Star topology should be used for the core network to facilitate centralized management and efficient data transmission, while bus topology can be adopted within individual labs to enhance flexibility and scalability. This hybrid topology ensures high network performance and provides good fault tolerance and scalability.

5.7. Are there any specific security requirements for the network, such as firewalls, intrusion detection, or access control? 【7】

- Based on group discussions and online research, it is recommended to introduce next-generation firewalls (NGFW) for deep packet inspection (DPI), along with intrusion detection systems (IDS) or intrusion prevention systems (IPS) for real-time threat detection and response. Additionally, role-based access control (RBAC) should be implemented to ensure that different user groups can only access resources within their permission scope, further enhancing network security.

5.8. What kind of Internet Service Provider (ISP) options are available, and what are the bandwidth capabilities?

- According to Dr's professional advice , the project will be based on UTM specifications, but the construction team must propose specific bandwidth requirements. Based on group discussions, for high-demand areas like video conferencing rooms and IoT labs, it is recommended to provide at least 1 Gbps of bandwidth per floor to support multiple concurrent users for HD meetings and large data transfers. The construction team should also consider multi-path redundancy to improve network availability and fault tolerance.

5.9. What type of cabling (e.g., Cat5e, Cat6, fiber optic) will be used, and what are the installation standards? 【8】

- Based on group discussions and online research, it is recommended to use fiber optic cables for the backbone network to ensure high-speed data transmission, while Cat6 cables can be used for local area network wiring within floors to meet gigabit network requirements. All wiring should comply with TIA/EIA standards to ensure installation quality and long-term reliability.

5.10. What type of network devices (e.g., routers, switches, access points) are used by the college now, and what are their specifications? 【9】

- Since this is a new building, based on group discussions and online research, it is suggested to use core routers with advanced routing features, stackable gigabit switches, and Wi-Fi 6-compatible access points to enhance overall network performance and scalability. Network devices should also have redundant power supplies and failover features to improve network stability.

5.11. Are there any specific compliance or regulatory requirements to be adhered to (e.g., GDPR, HIPAA)? 【10】

- Based on group discussions and online research, considering the importance of data privacy and security, it is recommended to comply with GDPR (General Data Protection Regulation) or similar regulations to protect user data from misuse. If medical or other sensitive data is involved, it is also necessary to consider compliance with industry-specific regulations such as HIPAA

(Health Insurance Portability and Accountability Act).

5.13 Document List:

1. National Institute of Standards and Technology (NIST). "Cybersecurity Best Practices for Enterprises." 2021.
2. International Journal of Project Management. "Cost Allocation in IT Projects." 2020.
3. Cisco White Paper. "Network Management Automation: Techniques and Tools." 2019.
4. IEEE Transactions on Cloud Computing. "Data Backup Strategies for Modern Enterprises." 2022.
5. IEEE Network Magazine. "Bandwidth Planning for Smart Buildings." 2023.
6. ACM SIGCOMM. "Hybrid Network Topology in Large-Scale Networks." 2019.
7. SANS Institute Research Report. "Implementing Next-Generation Firewalls." 2020.
8. Optical Fiber Technology. "Fiber Optics in Data Communication Networks." 2022.
9. Network World Journal. "Advanced Network Devices for Enterprise Networks." 2023.
10. Data Privacy Journal. "Data Protection and Compliance in IT Systems." 2022.
11. Special thanks to the Dr. Kaiyisah Hanis Mohd Azmi for her help here.

6 Feasibility Analysis

6.1. Network Security

Strategy : The proposed security strategy involves implementing regular vulnerability scans, real-time intrusion detection systems (IDS), and automated updates.

Feasibility : The use of AI-based monitoring tools can be effectively integrated to enhance threat detection, making this a feasible and robust approach. The security infrastructure is aligned with industry standards, ensuring scalability and adaptability.

6.2. Budget Allocation

Budget Focus : The budget primarily covers capital expenditures (CapEx) such as hardware procurement, network equipment installation, and infrastructure construction.

Feasibility : A phased budgeting approach allows for managing initial setup, scaling operations, and future upgrades effectively. The project's financial planning aligns with practical cost management principles, making it feasible within the defined parameters.

6.3. Network Management and IT Team

Management : UTM will handle operations, supported by advanced network management software.

Feasibility : With a dedicated IT team and advanced software tools like SolarWinds or Nagios for real-time performance monitoring, network management is achievable and aligns with UTM's operational structure, indicating high feasibility.

6.4. Data Backup and Recovery

Backup Strategy : Multi-tier data backup involving daily local backups and weekly cloud backups, complemented by encryption.

Feasibility : The strategy ensures data integrity and recovery, making it feasible for handling data in a secure and reliable manner.

6.5. Network Requirements for Each Floor

Bandwidth and Capacity : The plan includes specific bandwidth requirements tailored for different labs and video conferencing rooms, with high bandwidth for IoT labs and low latency for video conferencing.

Feasibility : The use of IEEE standards for bandwidth ensures adequate support for concurrent users and devices, making it a technically feasible approach.

6.6. Network Topology

Design : A hybrid topology is proposed, with star topology for the core network and bus topology for labs, ensuring centralized management and scalability.

Feasibility : This flexible design is suitable for both current and future needs, ensuring efficient data transmission and fault tolerance, thus confirming the feasibility of the topology.

6.7. Network Security Requirements

Specific Measures : Integration of next-generation firewalls, IDS/IPS, and role-based access control (RBAC).

Feasibility : This layered security strategy aligns with industry practices and enhances overall protection, making it a feasible and effective approach.

6.8. Internet Service Providers (ISP) and Bandwidth

ISP and Bandwidth : The project plans for at least 1 Gbps bandwidth per floor, with multi-path redundancy for high-demand areas.

Feasibility : Ensuring adequate bandwidth capacity and redundancy measures makes the network plan resilient and feasible for handling future traffic demands.

6.9. Cabling and Installation Standards

Cabling : The use of fiber optic cables for the backbone and Cat6 for internal wiring is recommended.

Feasibility : Compliance with TIA/EIA standards and proper installation ensures long-term reliability, making the cabling strategy feasible.

6.10. Network Devices

Devices : Core routers, stackable switches, and Wi-Fi 6 access points are proposed.

Feasibility : These devices offer scalability, compatibility, and future-proofing, making the network infrastructure feasible.

6.11. Compliance and Regulations

Compliance Requirements : Compliance with GDPR, HIPAA, and other regulations as needed is part of the design.

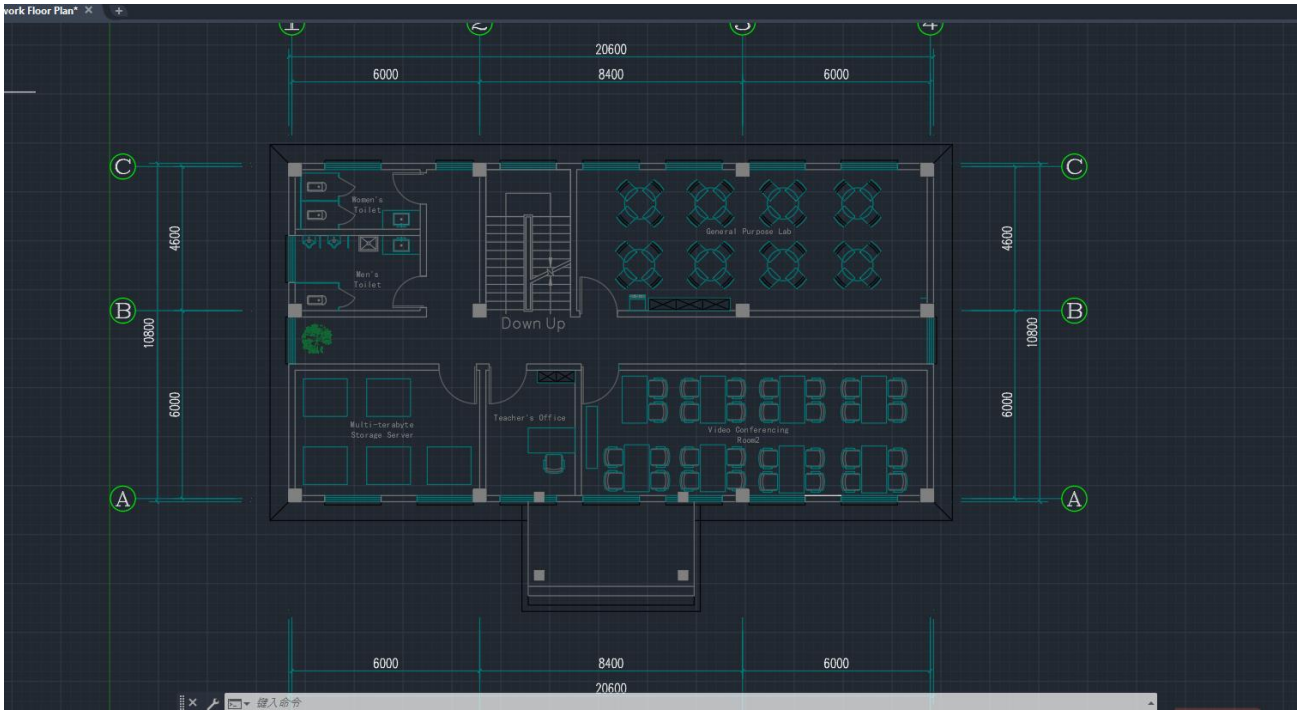
Feasibility : Establishing a compliance framework ensures data protection and legal adherence, confirming the project's feasibility.

6.12.Conclusion

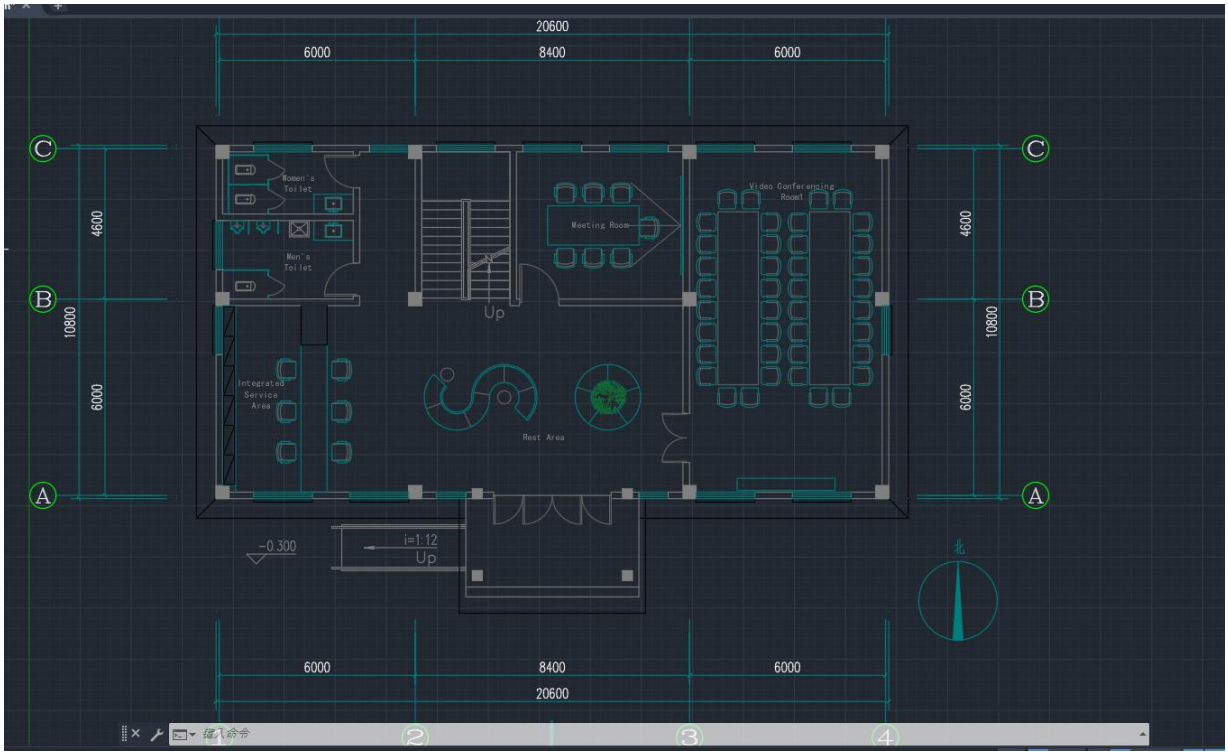
The Network Floor Plan Design project is feasible based on the technical, financial, and compliance aspects outlined. The strategies for network security, management, bandwidth allocation, and compliance with regulations ensure that the project can be executed effectively while meeting current and future demands. The phased approach to budgeting and the use of scalable technologies contribute to the over all feasibility, making the project viable and sustainable.

7. Floor plan overview

7.1 Second floor



7.2 First floor



7.3 Third floor